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proper starting point of binomial nomenclature, the authors fail sometimes to follow these announced principles through adopting a system of nomenclature beginning with the twelfth edition of Linnæus (1766).

An introduction of some 20 pages contains a sketch of ornithological exploration in Brazil, its faunal regions as indicated by a study of its avifauna, zoögeographical considerations, the preparation of the present catalogue, and questions of nomenclature and terminology, a list of the principal literature, and a systematic index. The two maps show (1) the distribution of forests and campos in South America, and (2) the zoögeographic zones of Brazil and their subdivisions. These are indicated as *Fauna amazonica*, *Fauna do Brazil central*, and *Fauna do Brazil littoral*, each with a subdivision.

The present volume enumerates 400 genera, 1567 species, and 213 subspecies, of which 1102 species are represented in the Museu Paulista by 6984 specimens. The technical name of each species in the Catalogue is followed by a reference to the volume and page of the British Museum 'Catalogue of Birds' where it is described; by its vernacular name; by the citation of references to it, if any, in von Ihering's papers in the 'Revista do Museu Paulista,' and sometimes other references; by a statement of its geographical distribution, in general terms, and by a list of localities represented by specimens in the Museu Paulista. In case of species or subspecies described since the publication of the British Museum Catalogue a reference is given to the place of original description. There are also often brief technical notes on questions of nomenclature and the status and relationship of forms. In the Addenda (pp. 406-423) are further notes on a number of species, with the addition of others described during the printing of the work, etc. An Appendix of fifteen pages contains reprints of descriptions of four species of hummingbirds described by E. J. da Silva Maia in 1843 and 1852. Alphabetic indexes to both the scientific and vernacular names close this important and highly useful volume.—J. A. A.

**Beal on Birds as Conservators of the Forest.**—In a paper of 40 quarto pages,<sup>1</sup> with 12 colored plates, Professor Beal treats of the utility of birds as protectors of forests. About one half of the text is, as would be expected, devoted to the Woodpeckers, the rest to a varied assortment of birds belonging to a number of families, as Nuthatches, Creepers, Jays, Finches, Warblers, Thrushes, Vireos, Cuckoos, etc. The verdict is reached that birds, particularly tree-inhabiting species, are of decided economic importance. The woodpeckers are ranked as of the highest value as destroyers of injurious tree-infesting insects, since they seek out and destroy the wood-boring larvæ of many noxious species. Other birds search the bark, and others still the leaves, for caterpillars and other insect pests. The

<sup>1</sup> Birds as Conservators of the Forest. By F. E. L. Beal. Rep. New York Forest, Fish and Game Commission, 1902-3, pp. 235-274, with 12 colored plates, by L. A. Fuertes. Published November, 1906.

rôle played by numerous species is distinctly outlined, based on the examination of the contents of their stomachs. The report is made attractive to the general reader not only by the valuable information it contains but by a series of beautiful chromo-lithographic plates, from drawings made by the well-known bird artist Fuertes. The species figured are the Red-headed Woodpecker, adult and young; Northern Hairy Woodpecker, White-backed Three-toed Woodpecker, Flicker, Yellow-bellied Sapsucker, Black-backed Tree-toed Woodpecker, Red-breasted Nuthatch, Blackburnian Warbler, Mourning Warbler, Yellow-billed Cuckoo, Solitary Vireo, Black-capped Chickadee, Brown Creeper, Blue Jay, and American Red Crossbill, all well adapted for striking effects.—J. A. A.

**Beal on California Birds in their Relation to the Fruit Industry.**<sup>1</sup>—This 'Bulletin,' is based on investigations by the writer in California during the fruit seasons of 1901, 1903, and 1906, covering a period of about nineteen months. Dr. C. Hart Merriam, Chief of the Biological Survey, in his 'Letter of Transmittal' to the Secretary of Agriculture, says: "The investigations embodied in this report were undertaken with a view to the accurate determination of the economic status of every species of California bird that inhabits orchards, in order that it may be possible for the fruit raiser to discriminate between friends and foes; and for the added purpose of suggesting remedial measures for the protection of fruit from destructive species." Professor Beal, in summarizing his results, insists "that sound public policy everywhere forbids the destruction of birds on a large scale for the purpose of protecting orchard fruits. Wholesale slaughter of birds in the supposed interest of the orchardist is fortunately rare and often proceeds from a mistaken idea of their economic relations. When it is understood that the damage by certain species is local and exceptional, that the birds in question are on the whole beneficial and that their destruction will be a loss to the State, the farmer and the orchardist are usually willing to adopt less drastic measures in defense of their crops and to spare the birds for the sake of the general weal."

After discussing the causes and general conditions of depredations by birds, the birds that injure fruit in California are passed in review and the evidence bearing on the economic status of each is given in much detail, based on the examination of their stomach contents. The House Finch (*Carpodacus mexicanus frontalis*) is stated to have been the subject of more complaint than all other species of birds together. Yet the examination of over 1200 stomachs shows that fruit is far from being its principal food, which consists mainly of the seeds of weeds, and that a far greater quantity of fruit is eaten by other species, as the Cedar Waxwing and the

<sup>1</sup> Birds of California in Relation to Fruit Industry, Part I. By F. E. L. Beal, Assistant, Biological Survey, U. S. Department of Agriculture. Biological Survey, Bulletin No. 30, 8vo, pp. 100, with a colored frontispiece (California Bush-Tit) and 4 half-tone plates. Issued Nov. 11, 1907.